NON-PUBLIC?: N
ACCESSION #: 9001020207
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Vogtle Electric Generating Plant - Unit 2 PAGE: 1 OF 6

DOCKET NUMBER: 05000425

TITLE: Heater Drain Tank Valve Reassembly Error Leads to Turbine/Reactor Trip
EVENT DATE: 12/02/89 LER #: 89-031-00 REPORT DATE: 12/22/89

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: R.M. Odom, Nuclear Safety and Compliance TELEPHONE: (404)826-3201

COMPONENT FAILURE DESCRIPTION:
CAUSE: E SYSTEM: SN COMPONENT: LCV MANUFACTURER: F130
REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On 12-2-89, plant personnel were releasing a clearance on Heater Drain Tank (HDT) high level dump valve 2LV-4334. The high level dump valve for Moisture Separator Reheater (MSR)"D", 2LV-4525, was in a 50% jacked-opened position due to 2LV-4334 being isolated. Upon opening the valve which isolated 2LV-4334, it became evident that 2LV-4334 was not closed. The HDT level decreased and the normal level control valve, 2LV-4332, closed. The isolation valve was reclosed and HDT level rose; however, 2LV-4332 failed to reopen resulting in rising feedwater heater levels and, due to the configuration of 2LV-4525, MSR D level rose as well. At 0341 CST, MSR D level reached the high level setpoint giving a turbine/reactor trip.

The root cause for the event was cognitive personnel error involving reassembly of 2LV-4334. The valve was reassembled such that its position

indication showed closed when it was actually full open. For 2LV-4332, the level control sensing lines were discovered to be clogged which resulted in its malfunction.

Actions to prevent recurrence include discussing this event in maintenance shop meetings, implementation of a periodic task to blowdown the level control sensing lines associated with 2LV-4332, and inclusion of this event in operator continuing training.

END OF ABSTRACT

A. REQUIREMENT FOR REPORT

This report is required per 10 CFR 50.73 (a)(2)(iv), since the event resulted in an automatic actuation of the Reactor Protection System (RPS).

B. UNIT STATUS AT TIME OF EVENT

At the time of this event, Unit 2 was in Mode 1 (Power Operation) at 100% of rated thermal power. Moisture Separator Drain Tank (MSDT) "D" high level dump valve, 2LV-4525, was in a 50% jacked-opened position to reduce flow to Heater Drain Tank (HDT) "B" since HDT "B" high level dump valve, 2LV-4334, was out of service for maintenance. No other plant equipment was inoperable or otherwise in an off-normal status such that it contributed to the occurrence of this event.

C. DESCRIPTION OF EVENT

On 12-2-89, plant personnel were in the process of releasing a clearance on 2LV-4334 in order to perform post maintenance functional testing on this valve. At approximately 0330 CST, a plant equipment operator (PEO) began opening manual isolation valve 2-1304-U4-052, thereby unisolating 2LV-4334. Due to problems which had been experienced on 11-5-89 (reference LER 425/89-029), when restoring the HDT "A" high level dump valve to service, the activities were being directed by an on-shift operations supervisor (OSOS) who was present at the valve with a maintenance supervisor, a maintenance foreman, and an instrumentation and controls foreman. Also, preparations had been made to establish direct communication with the Unit 2 Control Room; however, communication had not yet been established when the PEO was directed to open the manual isolation valve.

With the manual isolation valve approximately 10% open, the line started moving and it became evident that 2LV-4334 was not closed even though the local indication showed full closed. This allowed HDT "B" to start dumping to the main condenser. The Control Room observed HDT "B" level decrease and then the normal level control valve (i.e., Heater Drain Pump "B" discharge control valve), 2LV-4332, closed on low level.

The PEO was directed to reclose the manual isolation valve and HDT "B" level started increasing. Main feedwater pump "A" and "B" suction pressure had dropped due to valve 2LV-4332 being closed and the standby condensate pump was started to restore suction pressure. As HDT "B" level increased, valve 2LV-4332 failed to reopen. This caused HDT "B" level to go off-scale high and the levels in feedwater heater "4B", feedwater heater "5B", MSDT "C", MSDT "D", and Moisture Separator Reheater (MSR) "D" began to increase as well. The OSOS then proceeded to 2LV-4332 to attempt to open this valve using the handwheel. The Support Shift Supervisor similarly proceeded to 2LV-4525 to attempt to further jack it open. However, before either of these actions could be accomplished, MSR "D" level reached the high level setpoint causing a turbine trip which resulted in a reactor trip at 0341 CST.

On the reactor trip, all control rods fully inserted, the Main Feedwater System isolated and the Auxiliary Feedwater (AFW) System actuated as designed. Control Room operators entered emergency operating Procedure 19000-C, "E-0 Reactor Trip
r Safety Injection,"
and then responded to throttle AFW flow and maintain steam generator water levels. By 0353 CST, the plant had been stabilized in Mode 3 and unit operating Procedure 12006-C, "Unit Cooldown to Cold Shutdown," was entered.

Several abnormalities occurred following the reactor trip but had no impact on the ability to shutdown the reactor and maintain it in a safe shutdown condition. These occurrences included the lifting and reclosing of steam generator atmospheric relief valve 2PV-3020, at a steam line pressure below the lift setpoint; an apparent waterhammer involving feedwater heater "4B"; and the trip of breakers 2NBL1-04 and 2NBL1-13 during the residual transfer of 4160 V switchgear 2NA01. The trip of breakers 2NBL1-04 and 2NBL1-13 resulted in normal lighting not being restored to portions of the Auxiliary Building and the Control Building following completion of the

residual transfer of 2NA01. Operators responded to reset these breakers and restore lighting to these areas.

D. CAUSE OF EVENT

The maintenance of 2LV-4334 had required the removal of the pneumatic actuator from the valve to allow rebuilding of the actuator in the maintenance shop. Since the valve was not to be removed from the line, the maintenance crew that removed the actuator had match-marked the valve in the open position. A second maintenance crew had rebuilt the actuator and reinstalled it using the maintenance match marks. A third crew had tested the valve operation and reinstalled the position indication to match the actuator piston position.

After the reactor tripped, the maintenance match marks were checked and were found to disagree with the valve position indication by 90 degrees. It was then realized that a reassembly error had occurred in that the actuator piston had been in the closed position when the actuator was reinstalled on the valve which had been match-marked in the open position.

This reassembly error was not recognized when the lever which connects the actuator piston connecting rod to the valve shaft was placed back onto the valve shaft since this lever will fit onto the valve shaft with the actuator piston in either an open or closed position. Stroking of the valve, after reinstallation of the actuator but with the downstream isolation valve still closed, had also failed to reveal the error since the valve ball is free to rotate 360 degrees (i.e., the valve was actually being stroked between the open position and a position 90 degrees beyond open). Therefore, when the downstream isolation valve was opened, 2LV-4334 was actually in a full open position even though its position indication showed full closed. This lead to the reactor trip as previously discussed.

The root cause for the reassembly error was cognitive personnel error. The maintenance crew that reinstalled the actuator failed to recognize the need to verify the correct actuator piston position as compared to the valve ball position. The maintenance work order controlling the work on 2LV-4334 contained instructions to use both the vendor valve instruction manual and the vendor actuator instruction manual for performing the work. Subsequent interviews of involved personnel revealed that only the actuator instruction

manual was used. The valve instruction manual contains details on determining the correct lever/valve shaft orientation based on factory index marks located on these individual parts and therefore should have been used as well.

The failure of the normal level control valve, 2LV-4332, to reopen as HDT "B" level increased also contributed directly to the reactor trip. Had this valve responded properly, the reactor trip would not have occurred. Flushing of the associated level control sensing lines and pot after the reactor trip revealed that these lines had become clogged with a gunk type substance. The root cause for the failure of 2LV-4332 was the clogged sensing lines and a contributing cause was that no preventive maintenance (PM) task presently exists to periodically blow down or otherwise flush these sensing lines.

The cause for steam generator atmospheric relief valve 2PV-3020 opening below its setpoint and the cause for the trip of breakers 2NBL1-04 and 2NBL1-13 is still being investigated.

E. ANALYSIS OF EVENT

On the reactor trip, all control rods were observed to fully insert into the core. Main feedwater isolated and Auxiliary Feedwater actuated as designed. The MSR high level setpoint turbine trip actuated as designed to trip the turbine and protect it from water induction damage. No operator action was required to reclose 2PV-3020. The loss of lighting in portions of the Auxiliary and Control Buildings was an operator inconvenience which was promptly corrected by resetting breakers 2NBL1-04 and 2NBL1-13. The apparent waterhammer involving feedwater heater "4B" resulted in no damage to any safety related equipment. Based on these considerations, there was no adverse effect on plant safety or on the health and safety of the public.

F. CORRECTIVE ACTIONS

1. The actuator was removed from 2LV-4334 and reinstalled with the actuator piston correctly aligned with the valve ball position.

2. This event, including the need to ensure proper use of vendor manuals when required by maintenance work order instructions and the need to ensure all pertinent information is conveyed to the next maintenance crew, will be discussed in maintenance shop meetings by 2-1-90.

3. The level control sensing lines and the pot which provides the normal level control for HDT "B" were flushed with demineralized water and normal operation of 2LV-4332 was restored. A PM task will be implemented by 1-15-90 to provide for a periodic blowdown or flush of level control sensing lines and condensate pots for the Heater Drain Tanks.

4. This event, including a discussion of alternative methods of reducing flow to a heater drain tank, will be covered in operator continuing training by 4-1-90.

5. A walkdown of secondary piping and components associated with feedwater heater "4B" was performed after the waterhammer occurred. Two pressure indicators and a pin for a pipe hanger were found damaged. No other damage was found.

6. The control circuit for 2PV-3020 will be investigated and calibrated or repaired as required by 12-27-89.

7. Engineering will investigate the trip of breakers 2NBL1-04 and 2NBL1-13 by 1-31-90 to determine if any corrective action is required.

G. ADDITIONAL INFORMATION

1. Failed Components Identification

HDT "B" High Level Dump Valve 2LV-4334 Fisher Controls 12 - Inch Design V100 Vee-Ball Valve with Type 1061 Pneumatic Piston Rotary Actuator.

HDT "B" Normal Level Controls Loop 2LCL-4332 Fisher Controls 14 - Inch Cage Style Level-Trol Model No. 2502-249B.

2. Previous Similar Events

The event which resulted in a reactor trip on 11-5-89 (reference LER 425/89-029) was similar in that the event was initiated when a HDT high level dump valve was restored to service. However, the root causes for these two events differ in that operator actions were appropriate in responding to the current event.

3. Energy Industry Identification System Codes

Main Feedwater System - SJ

High Pressure Heaters and Moisture Separator Reheater Drains
and Vents System - SN

ATTACHMENT 1 TO 9001020207 PAGE 1 OF 1

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ELV-01187
0179

December 22, 1989

Docket No. 50-425

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Gentlemen:

VOGTLE ELECTRIC GENERATING PLANT
LICENSEE EVENT REPORT
HEATER DRAIN TANK VALVE REASSEMBLY ERROR
LEADS TO TURBINE/REACTOR TRIP

In accordance with 10 CFR 50.73, Georgia Power Company hereby submits the enclosed report relating to an event

which occurred on December 2, 1989.

Sincerely,

W. G. Hairston, III

WGH,III/NJS/gm

Enclosure: LER 50-425/1989-031

xc: Georgia Power Company
Mr. C. K. McCoy
Mr. G. Bockhold, Jr.
Mr. P. D. Rushton
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NORMS

U. S. Nuclear Regulatory Commission
Mr. S. D. Ebneter, Regional Administrator
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